From Nature To Your Home

The AMAZING journey of a GLASS MARBLE

Terrapin

PEARSON Longman

A start-to-finish book on things you use everyday

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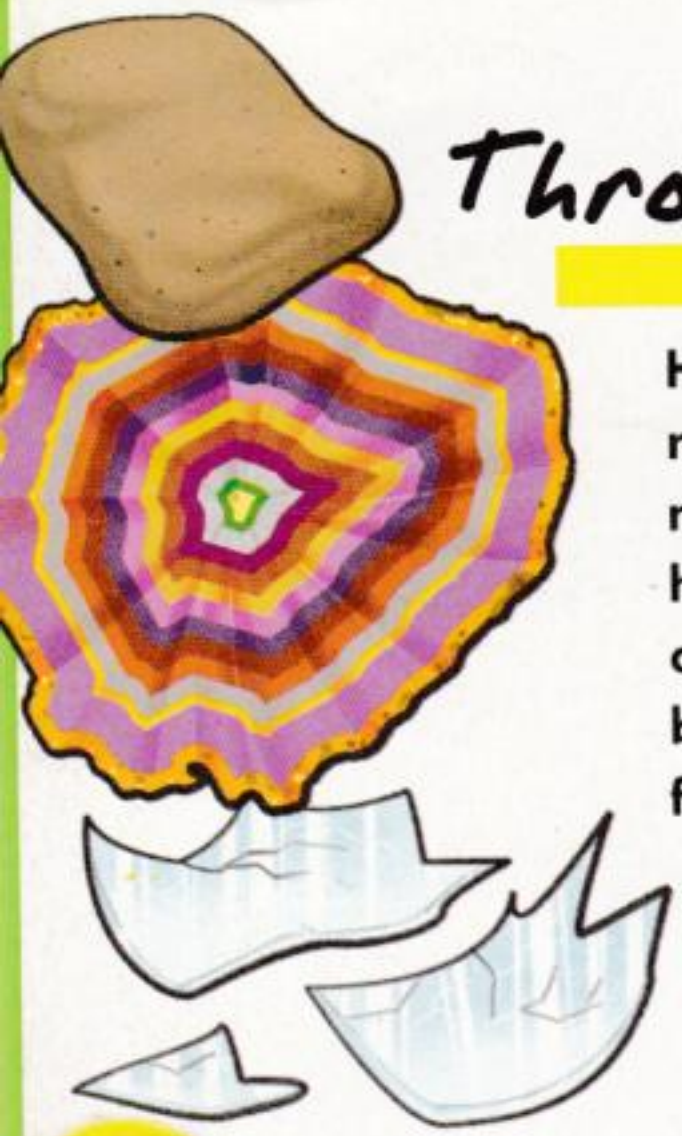
Through the glass



Hi, everyone! My name is Rick. I collect marbles. I have a collection of 264 marbles. Today, for 'show and tell,' I have brought some of them, along with one rare one. This one is very special because my parents bought it for me from Venice in Italy.

Most of my marbles are made of glass. I have some that are made of clay and agate. Most of my marbles have a diameter of about half-an-inch but a few of them have a diameter of over three inches. The diameter of the tiniest marble I have is one-fourth of an inch, and that of the biggest is ten inches.

I love to collect bright-coloured marbles. I have them in all the colours you can imagine.

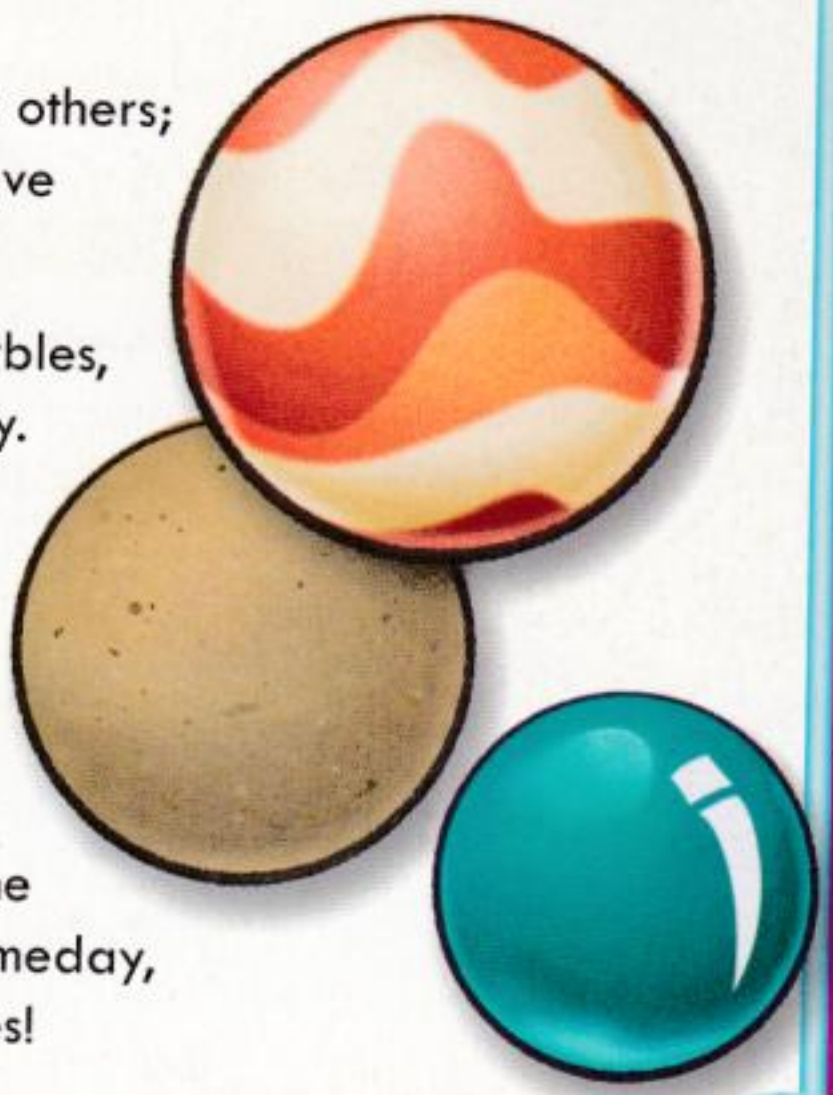
▲ Marbles are often made of glass as well as clay and agate.

◀ Marbles are as fun to collect as they are to play with.

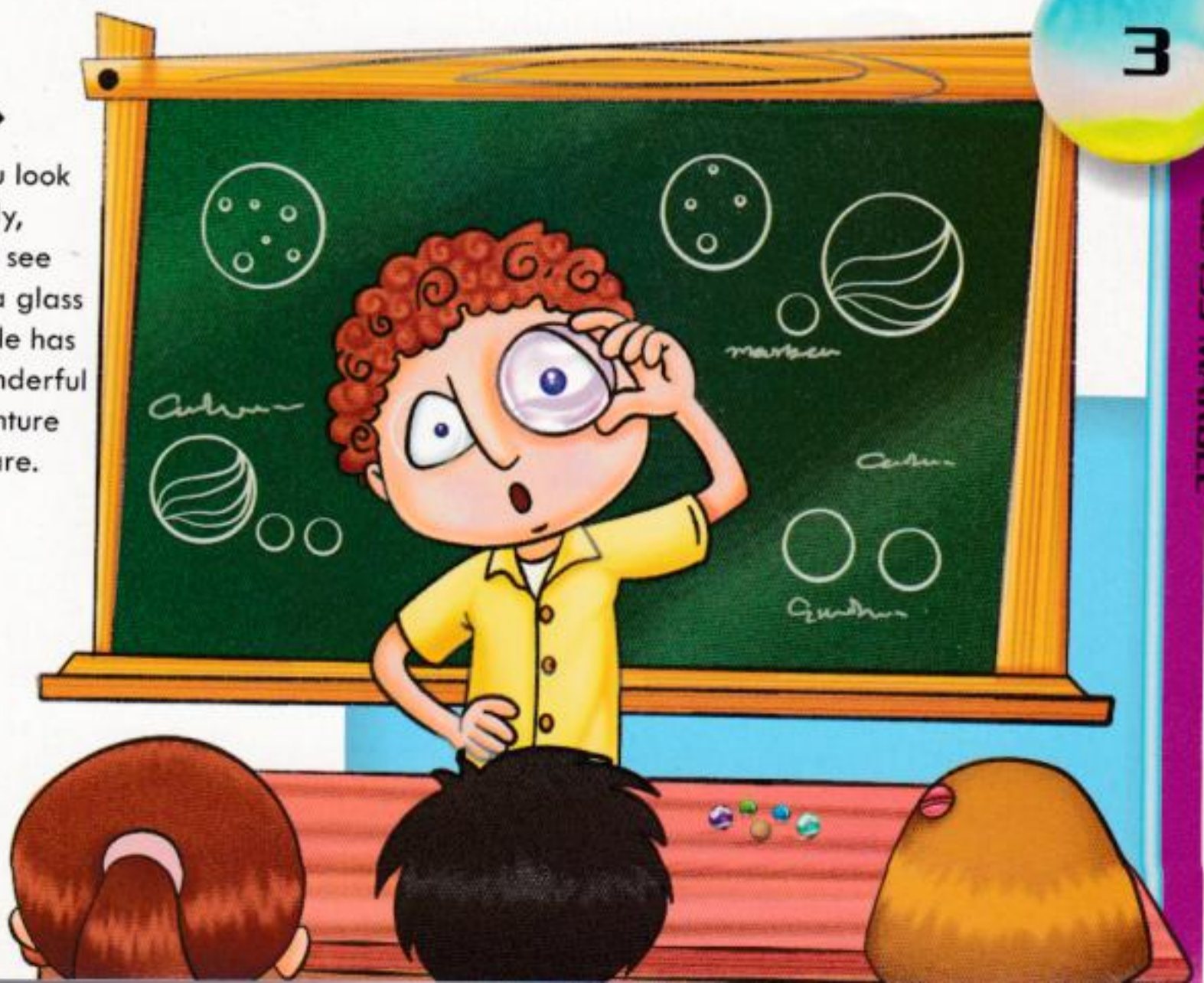
There are swirls on some, lines on others; some are speckled and others have spots.

When I first began collecting marbles, I broke many of them accidentally. Glass marbles chip and break easily, and even a small hit can damage them.

Every year, on my birthday, my parents buy me two sets of marbles—one to play with and the other to keep in my collection. Someday, I hope to have a thousand marbles!

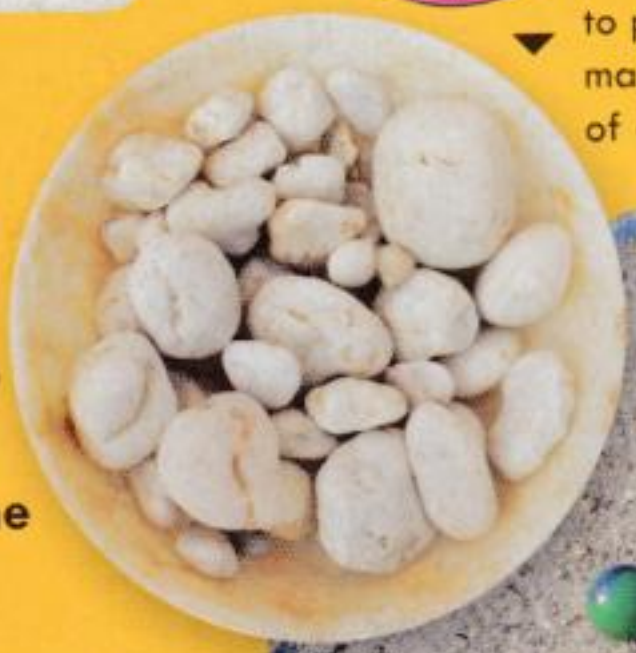


If you look closely, you'll see that a glass marble has a wonderful adventure to share.



Marble marvel!

The Greeks and Romans preferred to play with marbles made of alabaster.



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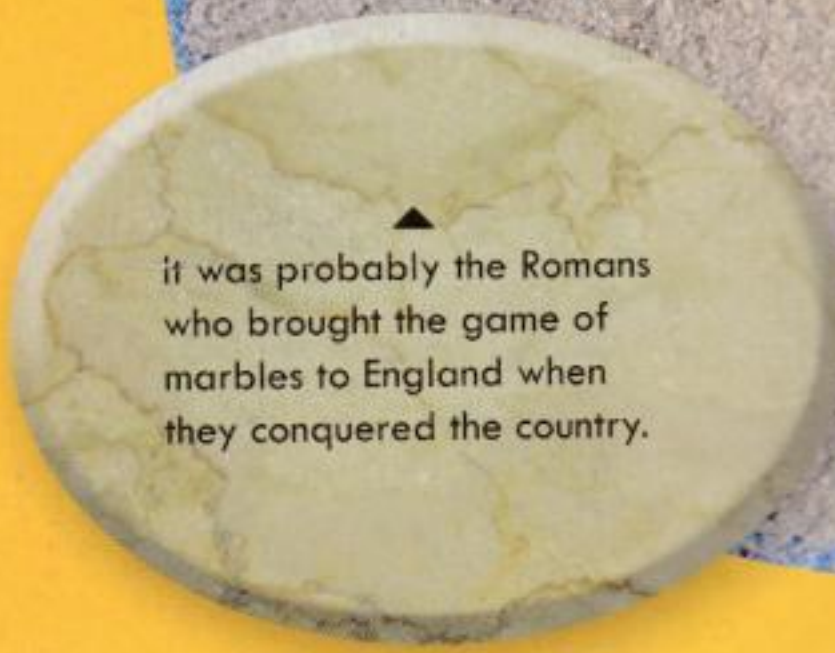
Those who do not understand why some people are crazy over marbles should know that cave men and women, who lived on the earth millions of years ago, were just as marble-crazy. They were the first people to play with small round pebbles and marbles of clay.

The Egyptians, Romans, and Greeks loved their marbles. Many pieces from their time have been found in different parts of the world.

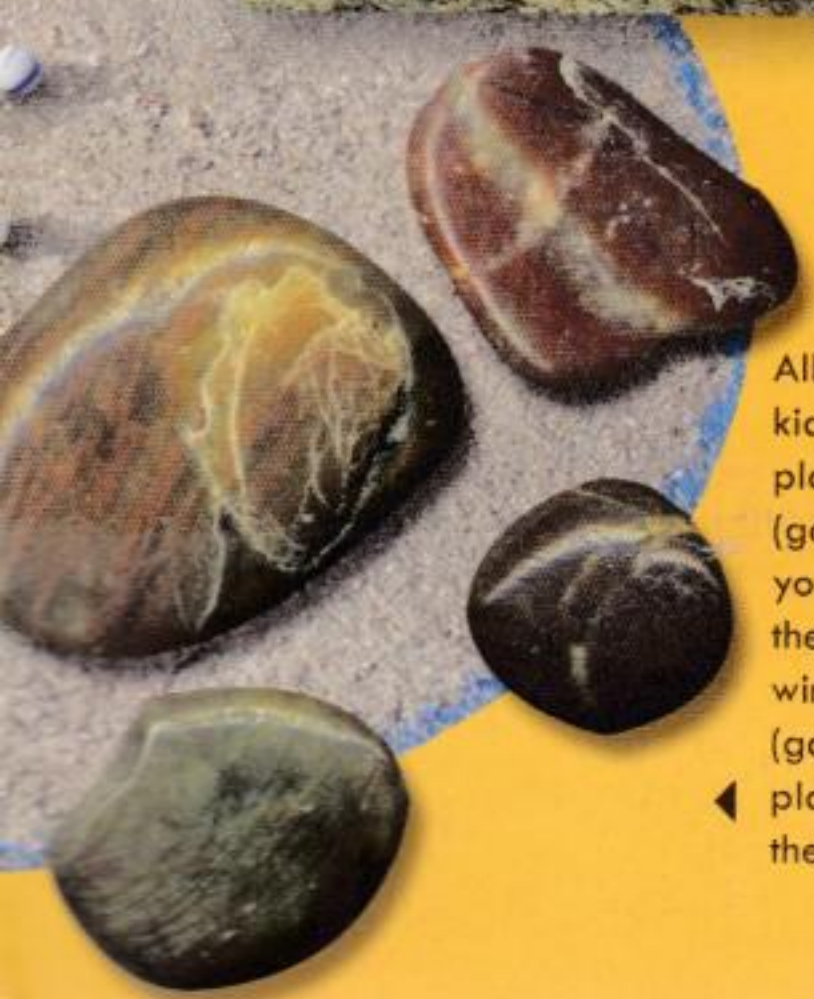


it was probably the Romans who brought the game of marbles to England when they conquered the country.

The word 'marble' means 'rock' in the German language. In the 1600s, water mills in Germany became mini marble factories that made round balls from stones like marble and alabaster.

Even children in ancient Egypt played with marbles.

Early men played with marbles made of clay.



Glass marbles were first made in the 1800s. In 1846, a German glass blower invented a pair of scissors – marbelschere – that could cut glass and make marbles.

All around the world, kids have been playing 'keepsies' (games in which you get to keep the marbles you win) or 'friendlies' (game in which all players take back their marbles).

In China, children do not use their hands to play marble games. They kick them with their feet!

See-through sand

Glass is made mainly from three powders—silica, lime, and soda. Silica is obtained from very fine white sand. Lime and soda may sound like things you make lemonade with, but these are materials found in the earth.

1 Silica, soda, and lime are mixed together in just the right amount. The mixture is heated to more than two thousand degrees Celsius in a very hot oven, or furnace, for a whole day.

2 Bits and pieces of old or broken glass are also added to this mixture. It is then left to cool down, but not completely.

Soda, silica, and lime are mixed and heated in a furnace.

People look at me and think I am a solid. Actually, I am a liquid and a 'super cool' one at that!

An orange syrup is formed. This is molten glass.

Molten glass is shaped into glasses, marbles, and other products.

Cullet is added to the heated mixture of soda, silica, and lime.

3 When cooler, the mixture looks like a thick orange-red syrup. This is molten, or liquid, glass. Molten glass is shaped to make marbles, drinking glasses, car windscreens or other things. As it cools fully, it hardens into glass.

These days, marbles are made in machines, but a few around the world are also hand-made.

Broken or waste glass that is used for re-melting is called 'cullet'.

Hand to mouth

Glass-blowers are experts who make glass items by hand, and also by mouth! Hand-made pieces of glass like marbles are very expensive simply because of the time it takes to make each piece, one at a time.

A blowpipe is used to pick up the molten glass from the furnace. The technique of glass-blowing developed as early as 50 BC.

Molten glass is cooled and shaped at the same time on the marver.

Glass-makers cut off the glass, once it gets the shape he wants.

Gathering molten glass on a blowpipe is much like gathering honey on a stick.

1 The glass-blower uses a long pipe called a blowpipe. He dips and rolls this into the furnace to pick up the molten glass.

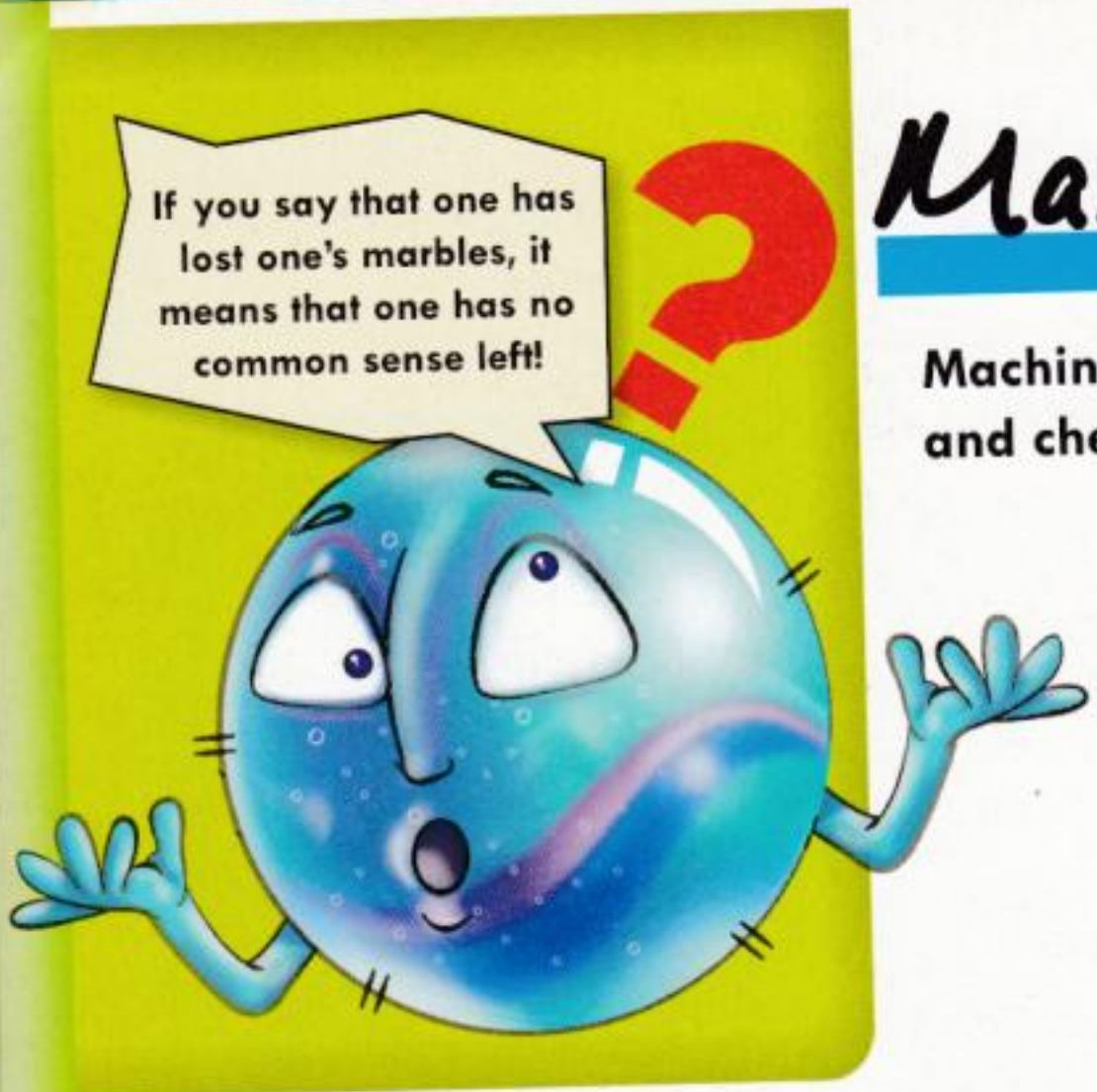
2 The pipe with the molten glass is rolled on a marver, or a thick sheet of steel.

3 Then comes the hardest part—that of blowing through the pipe to make the glass bubble bigger. The glass-blower blows and dips the bubble into the furnace many times over to add more molten glass. He uses different kinds of tools to flatten or twist the bubble while it is soft.

4 When the blown glass reaches the right size, he breaks it off from the pipe and lets the glass cool.

Glass-making is all about blowing, dipping, and rolling!

A glass-blower is also known as a 'gaffer'.



Mar-ball!

Machines make marbles faster and cheaper.

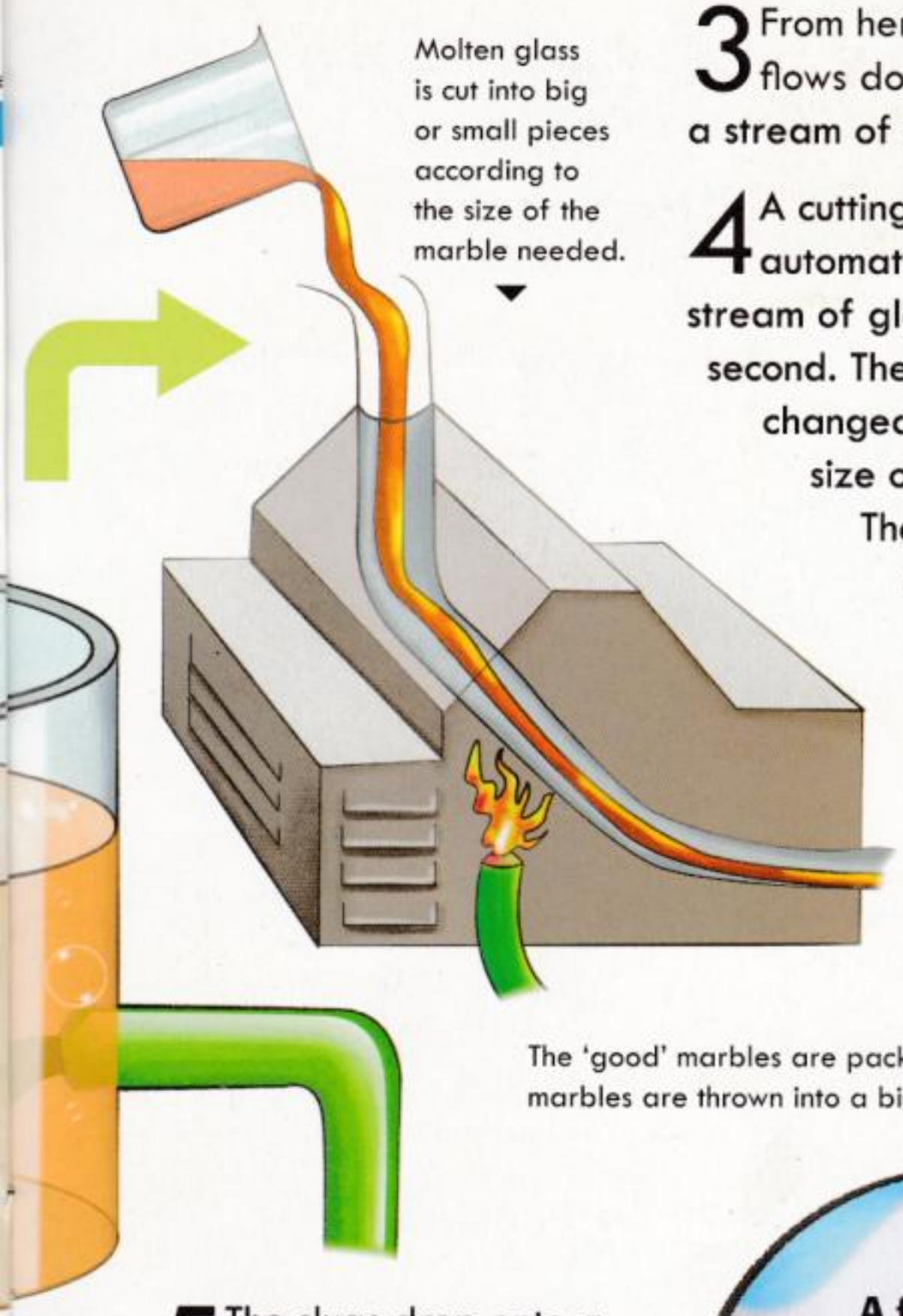
1 Marble-making factories use a lot of cullet, which is melted in a furnace.

2 Once the glass melts, it flows into a tank. Coloured molten glass is shot into it, which gives the marble its colour and design.

Molten glass is cut into big or small pieces according to the size of the marble needed.

3 From here, the molten glass flows down an open pipe like a stream of water.

4 A cutting machine automatically snips the stream of glass every half second. The cutting time is changed according to the size of the marbles. These cut pieces are called slugs.



The 'good' marbles are packed while the 'bad' marbles are thrown into a bin to use as cullet.

5 The slugs drop onto a moving slide that rolls them into a round shape. It also keeps them from sticking to each other. As the slugs cool down, they turn as hard as marbles!

A factory in Guadalajara, Mexico, produces about twelve million marbles a day, which are then shipped to thirty-five different countries.

Like aluminium, I can be recycled again and again, and forever. Even after a million recycles, I will be as tough as ever!

Round and round, again and again...

Used bottles are collected and separated.

Old and broken glass pieces, marbles, bottles, and jars are collected and taken to a recycling centre.

1 Glass is sorted, and lids of bottles are removed. The glass is then sent to a processing plant.

The molten mixture is cooled and shaped into glass again!

2 At the plant, the glass pieces are crushed into cullet. The cullet is then taken to a glass factory.

3 At the factory, cullet is mixed with silica, soda, and lime to make glass.

The glass is crushed into cullet.

The cullet is added to silica, soda, and lime.

Cullet is also used in places you would never imagine. It could well be used in your home as fibreglass for padding between walls. This keeps homes cool in summer and warm in winter.

Tiny crushed glass pieces are also used to paint white lines on highways. The glass pieces in the paint reflect light from cars so that drivers can see their lanes at night.

Recycled glass is also used to make roads, beads, jewellery, roof tiles, flooring, and decorative stones.

Some foods and drinks are packed in dark glass containers. This is to protect them from light and keep them from going bad.

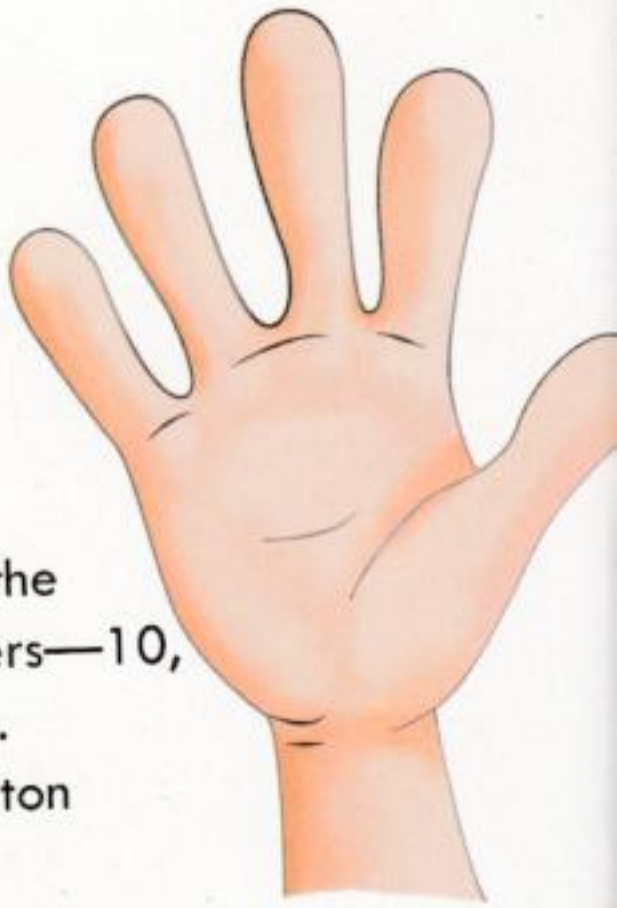
Shoot to win!

If you have never played a marble game, this may be a good time to give it a try. There are three kinds of games: circle games, hole games, and chase games.

In a circle game, players knock out others' marbles from a circle drawn on the ground. In a hole game, players aim and shoot their marbles into a hole or an opening. In a chase game players take turns shooting one another's marbles on the ground to win.

Things you need

● An empty egg carton ● Red pen ● One or more players ● Four or more marbles per person



Get going

1 Mark the cups of the carton with numbers—10, 20, 30, and so on. Place the egg carton on the floor.

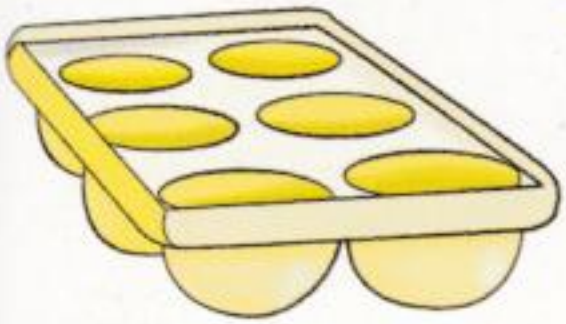
2 Use the hand you write with. Bend your thumb inwards.

3 Now bend your last two fingers. Place the marble on your index finger.

4 Roll your fingers around the marble and bend them towards your thumb. Hold your thumb with your middle finger.

5 Now, aim for a cup, and flick your thumb! Play all your marbles one at a time.

Add your points and challenge a friend to beat your score.



Know your marbles

Marble enthusiasts have their own dictionary of words when it comes to describing their collection. Know their marbles.

1. A 'taw' is a marble to shoot with and a 'duck' is a marble to shoot at.
2. In northern India, marbles are called 'kunche'.
3. An 'alley' is your best and most expensive marble.
4. American children have names for marbles of different sizes. From biggest to smallest, they are called kabolas, steelies, jumbos, milkies, and peewees.
5. Marrididdles are home-made clay marbles.
6. A marble with wavy lines of red, blue, black, white, and orange is called 'toothpaste'.
7. A 'turtle' is a marble that is green and yellow colour.

INDEX

THIS IS A GREEN BOOK

The AMAZING journey of a

GLASS MARBLE

It's Rick's turn in school for show-and-tell. He takes along his favourite thing and talks about where it came from and how. It's small and round and has a colourful design inside. It's a glass marble!

Let Rick take you on a glass marble's journey from nature to your home!

Other books in this series:

The Amazing Journey of a Soda Can
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